

## Department of Plant, Soil, and Insect Sciences: Concentration Requirements

### Applied Biology & Biotechnology

#### *I. Core Requirements of the Major*

##### **A. Biological Science**

- General Biology Sequence (BS, BS) BIOLOGY 100 and 101 8 cr.

##### **B. Ecosystems Studies**

- Select **one** of the following courses. 3 cr.

Intro Environmental Biology (BS)	ENVIRSCI 101	3 cr.
Plants, Soils and the Environment (SI)	PLSOILIN 115	3 cr.
Principles of Environmental Biology	ENVIRSCI 214	3 cr.
Society and Environment (SI)	NRC 100	3 cr.
Introductory Ecology	BIOLOGY 287	3 cr.

##### **C. Math, Statistics and Reasoning**

- Algebra/Anal. Geom/Trig (R1) MATH 104
- or Pre-CalcAlgebra/Anal. Geom/Trig MATH 101/ 102 3-4 cr.
- Intro Statistics for the Life Sciences RES-ECON 211
- or Elementary Statistics STATISTC 111
- or Intro to Statistics STATISTC 240 3 cr.

##### **D. Chemistry**

- General Chemistry CHEM 111 (PS) 4 cr.

##### **E. Junior Year Writing**

- Technical Writing PLSOILIN 380 3 cr.

#### **TOTAL CORE**

**24 - 25 cr.**

#### *II. Concentration Specific Requirements*

##### **A. Required Courses**

##### **1. Additional Math, Chemistry, and Biology**

- General Chemistry sequence (PS) CHEM 112 4 cr.
- Organic Chemistry (1 term minimum) CHEM 250 **or** 261 3 cr.
- Genetics BIOLOGY 283 3 cr.
- Cell & Molecular Biology BIOLOGY 285 3 cr.

Continued.

## 2. Focus

Students in the Applied Biology and Biotechnology must complete a Focus in one of two areas, General Applied Biology or Plant Science, listed below. **Students are strongly advised to consult with a faculty advisor on the selection of courses.**

Students may self select either 'General Applied Biology' or 'Plant Science' Focus

### General Applied Biology –select at least 15 credits

<input type="checkbox"/> Botany	PLSOILIN 102	4 cr.
<input type="checkbox"/> Soil Science	PLSOILIN 105	4 cr.
<input type="checkbox"/> Insect Biology	PLSOILIN 326	3 cr.
<input type="checkbox"/> Plant Physiology	BIOLOGY 510	3 cr.
<input type="checkbox"/> General Plant Pathology	PLNTSOIL 505	4 cr.
<input type="checkbox"/> Elementary Biochemistry	BIOCHEM 420	3 cr.
<input type="checkbox"/> General Physics	PHYSICS 131 or 151	3 cr.
<input type="checkbox"/> General Physics Lab	PHYSICS 133 or 153	1 cr.
<input type="checkbox"/> Organic Chemistry II	CHEM 262	3 cr.
<input type="checkbox"/> General Microbiology	MICBIO 310	3 cr.
<input type="checkbox"/> General Microbiology Lab	MICBIO 312	3 cr.

### Plant Science (all courses required)

<input type="checkbox"/> Botany	PLSOILIN 102	4 cr.
<input type="checkbox"/> Soil Science	PLSOILIN 105	4 cr.
<input type="checkbox"/> Plant Physiology	BIOLOGY 510	3 cr.
<input type="checkbox"/> General Plant Pathology	PLNTSOIL 505	4 cr.

### ***B. Experimental Techniques Course***

Students are required to take at least one course that will introduce them to experimental techniques used in Plant, Soil and Insect Sciences. Choose one from the list below.

Intro Biotech Laboratory	PLSOILIN 385
Molecular Systematics	PLSOILIN 397T
Gene & Genome Lab	BIOLOGY 397A
Genetics Lab	BIOLOGY 284
Tissue Culture	PLNTSOIL 500
Geographic Info Systems	NRC 592G
Intro to GIS	GEO-SCI 594A
Intro Digital Remote Sensing	W&FCONSV 587
Organic Chemistry Lab	CHEM 269
Organic Chemistry Lab I or II	CHEM 263 or 264
Analytic Chemistry	CHEM 312

### ***C. Research***

Students are required to conduct an Independent Study Research project. This can be combined with a Senior Honors Thesis.

- Total credits for Research (a minimum of 3 cr. must be taken) **(3 cr.)**

Continued.

#### ***D. Restricted Electives (15 cr.)***

Students are required to take advanced course work in a specific area within Plant, Soil and Insect Sciences, specifically 15 credits at or above 300-level, with at least 6 cr. at 500-level. Those courses which are taken to fulfill the requirements above cannot be used to fulfill the Focus requirement. Courses are grouped into sub-discipline areas for guidance only. Students may mix and match course selections across more than one subject area.

#### **Plant Biotechnology**

Gene and Genome Analysis	BIOLOGY 321
Biotechnology Lab	PLSOILIN 385
Plant Cell Biology	BIOLOGY 497C
Phyto/bioremediation	PLNTSOIL 597A
Plant Biotechnology	PLNTSOIL 597G
Tissue Culture	PLNTSOIL 500
Plant Breeding	PLNTSOIL 540
Plant Nutrition	PLNTSOIL 530
Diagnostic Plant Pathology	PLNTSOIL 535
Plant Genetics	BIOLOGY 597J
Plant Physiology	BIOLOGY 510

#### **Entomology**

Insect Biology	PLSOILIN 326
Insect Ecology & Management	PLSOILIN 397K
Insect Behavior	ENTOMOL 511
Biologic Control	ENTOMOL 523
Medical Entomology	ENTOMOL 574
Insect-Plant Interactions	ENTOMOL 597A
Systematic Entomology	ENTOMOL 655
Insect Structure & Function	ENTOMOL 657
Molecular & Cellular Entomol	ENTOMOL 666
Insect Ecology	ENTOMOL 683

#### **Plant Pathology**

General Plant Pathology	PLNTSOIL 505
Mgmt. and Ecology of Plant Disease	PLNTSOIL 510
Diagnostic Plant Pathology	PLNTSOIL 535
Post-harvest Physiology	PLNTSOIL 545
Nematology	PLNTSOIL 572
Plant Stress Physiology	PLNTSOIL 590A
Urban Environment and Plant Growth	PLNTSOIL 555
General Microbiology/Lab	MICROBIO 310/312

#### **Horticultural Science**

Deciduous Orch Sci	PLSOILIN 300
Small Fruit Production	PLSOILIN 305
Weed Management	PLSOILIN 310
Greenhouse Management	PLSOILIN 315
Greenhouse Crop Prod I	PLSOILIN 321
Vegetable Crop Production	PLSOILIN 325

Greenhouse Crop Prod II	PLSOILIN 335
Soil and Crop Mgt	PLSOILIN 350
Hydroponics	PLSOILIN 365
General Plant Pathology	PLNTSOIL 505
Mgmt. and Ecology of Plant Diseases	PLNTSOIL 510
Plant Nutrition	PLNTSOIL 530
Diagnostic Plant Pathology	PLNTSOIL 535
Plant Breeding	PLNTSOIL 540
Post-harvest Physiology	PLNTSOIL 545
Plant Growth Regulators	PLNTSOIL 550
Advanced Weed Science	PLNTSOIL 560
Environmental Soil Chemistry	PLNTSOIL 575
Soil Fertility	PLNTSOIL 580

### **Soil Science**

Soil & Crop Management	PLSOILIN 350
Soil & Water Conservation	PLSOILIN 375
Microbiology of Soil	PLNTSOIL 515
Soil Form & Classification	PLNTSOIL 565
Soil Physics	PLNTSOIL 570
Environmental Soil Chemistry	PLNTSOIL 575
Soil Fertility	PLNTSOIL 580
Phyto/Bioremediation	PLNTSOIL 597A
Wetland Delineation	PLNTSOIL 597L
Organic Contaminants in Soil	PLNTSOIL 597O
Inorganic Contaminants in Soil	PLNTSOIL 597X
Intro Geochemistry	GEO-SCI 415
Applied Environ. Geology	GEO-SCI 485
Aqueous Env. Geochemistry	GEO-SCI 519
Hydrogeology	GEO-SCI 587

**Total for Concentration Specific Requirements**

**48 - 50 cr.**

### ***E. Minimum Required Credits in the Department***

Note that students must take a minimum of 30 credits from within the Department of Plant, Soil and Insect Sciences.

**Total for the Applied Biology and Biotechnology Concentration**

**72 - 75 cr.**